University of Science
Viet Nam National University Ho Chi Minh

REPORT: PROJECT 2(EXPERT)

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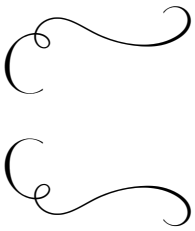
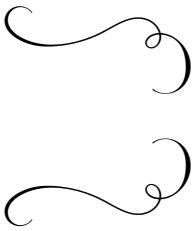


Lecturers
Ms. Tran Thi Thao Nhi
Mr. Bui Huy Thong



1 - Overall

*Notes: Open full console screen when playing the game.

Contents

2 - Features

2.1 Board design

- Using Struct definition with Two-dimensional array to design the board.
- The Two-dimensional array is defined by a Struct data type.
- ***Board selection***: Any sizes (n x m), can choose n rows and m columns (n, m values are from 3 to 17).

2.2 Game mode and Game play

- **Game mode and settings:**
  - ***Sound setting***: Can choose Turn on sound or Turn off sound at the beginning of the game.
  - ***Cursor Design***: Can choose Cursor symbol with 1 character and can choose

the color of each Cursor (Every Cursor must have a different symbol with the other).
- ***Multiple-Player and Single-Player***: Can choose PvP mode or PvE mode.
- ***Condition of winning (Time restriction)***: Can type the number of continuous icons to win from 3 to 5.(If the number of columns or the number of rows is 3, the default continuous icons to win is 3)
- ***Turn play***: Can type the number of turns of each Player from 10 to 289.
- ***PvP mode***: Player 1 uses keys: A, W, S, D to move the cursor around the board. Player 2 uses arrows keys to move the cursor around the board. Both players can use the Space bar or Enter to write the icon at the cursor's position.
- ***PvE mode***: Player can use A, W, S, D keys or arrows keys to move the cursor around the board. Player can use the Space bar or Enter to write the icon at the cursor's position. - ***Move suggestion***: Each turn there will appear a symbol (> <) to suggest the position for the player.

- **Game play:**
  - ***Valid move check***: The Player can't move the cursor outside the board and the icon can't be written at the position that already has another icon in a game.
  - ***Winning***: A player wins when has enough continuous icons and the game ends.
  - ***Game replay***: When a game is finished, you can choose to Replay the game.
  - ***Save game***: You can continue to play the unfinished game.

2.3 Display interface

- ***There are 2 common styles***: Black background with Light Aqua text and White background with Black text.
- ***Board Animation***: There are animations when moving the cursor and writing icons on the board.
- There are also animations in the settings.

2.4 Others

- ***Account Management***: To play the game, you must have an account and sign in. Each account that has signed up will be saved.
- ***Statistical Outcomes***: You can choose to see the statistical outcomes of all of the accounts that have signed up (Number of wins and loses in each mode PvP and

PvE).
- ***Sound***: The sound will play at the Welcome and after each game.

3 - Source code organization

3.1 Functions and annotations

- **Interface support function:**
  void welcome();

  void disable_selection();

  void set_color(int background_color, int text_color);

  void color_icon();

  void print_board();

  void design_cursor(int i, int j);

- **Audio support function:**
  void Sound();

  void Sound_Game_1();

- **Game support function:**
  void continue_game();

  void check_Y_N(char& re, bool& check);

  void check_account(char& rep, bool& existence);

  void show_list();

  void init();

  void update_old_board();

  void GoTo(SHORT, SHORT);

  void vertical_to_up(int x, int y, int current_y);

  void vertical_to_down(int x, int y);

  void horizontal_to_left(int x, int y, int current_x);

  void horizontal_to_right(int x, int y);

  void mainDiagonal_above(int x, int y, int current_x, int current_y);

  void mainDiagonal_below(int x, int y);

  void oppositeDiagonal_above(int x, int y, int current_x, int current_y);

void oppositeDiagonal_below(int x, int y);

void check_consecutive(int x, int y);

void processing_game_PvP();

void processing_P_go_first();

void processing_E_go_first();

bool check_win(int x, int y);

bool check_turn(int move);

void move_cursor_PvP(int&, int&, int&, int&, int&);

void move_cursor_PvE(int&, int&, int&, int&, int&);

void choose_move_processing_mainDiagonal(int adjacent, int i, int j, int i1, int j1, int i2, int j2, int& posX, int& posY, bool& check_move, int check_step);

void choose_move_processing_oppositeDiagonal(int adjacent, int i, int j, int i1, int j1, int i2, int j2, int& posX, int& posY, bool& check_move, int check_step);

void choose_move_processing_horizontal(int adjacent, int i, int j, int i1, int j1, int i2, int j2, int& posX, int& posY, bool& check_move, int check_step);

void choose_move_processing_vertical(int adjacent, int i, int j, int i1, int j1, int i2, int j2, int& posX, int& posY, bool& check_move, int check_step);

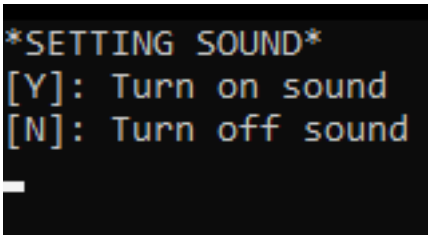
void choose_move(int adjacent, int& posX, int& posY, bool& check_move);

bool replay(char rep);

3.2 Running program

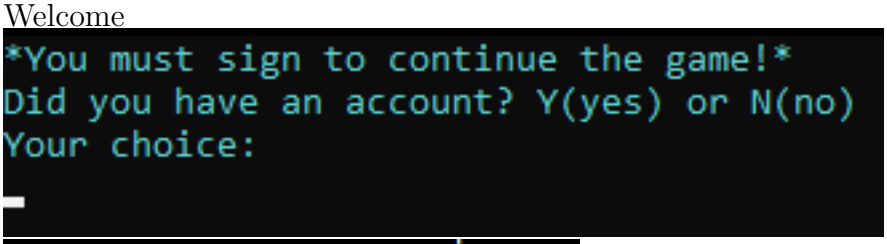
My code is running on Windows and must be compiled by IDE: Visual Studio Community 2019 and Compiler: MSVC.
Library:
#include <iostream>
#include <conio.h>
#include <Windows.h>
#include <fstream> // Using files
Because I use PlaySound function which is only available on Windows Operating System and can only run on Visual Studio 2019.
#pragma comment(lib,"Winmm.lib") supports for the PlaySound function.
The Sound is playing from the file: TICTACTOE.wav (This file will be sent with this report).

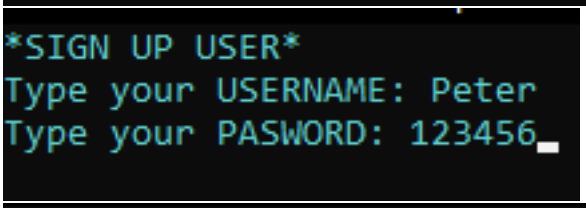
4 - Illustration

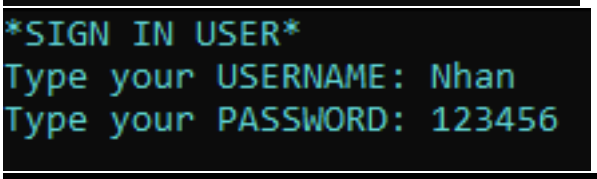


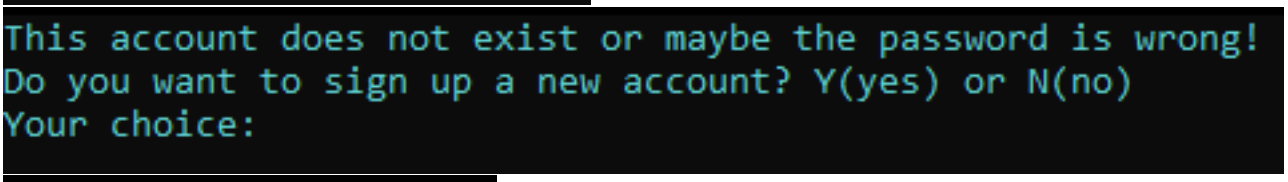
Set the sound game

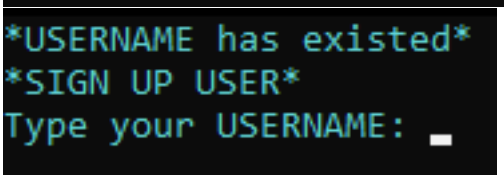
Welcome











Sign up/ Sign in account

```
You have sign in game already! Enjoy the game!!!
Type [L] to see the Statistical Outcomes or [Enter] to continue...
```

```
USERNAME: Nhan
PvE mode: LOSE: 0     WIN: 0
PvP mode: P1 WIN: 0     P2 WIN: 0

USERNAME: Nhann
PvE mode: LOSE: 0     WIN: 0
PvP mode: P1 WIN: 0     P2 WIN: 0

USERNAME: Peter
PvE mode: LOSE: 0     WIN: 0
PvP mode: P1 WIN: 0     P2 WIN: 0

USERNAME:
PvE mode: LOSE: 0     WIN: 0
PvP mode: P1 WIN: 0     P2 WIN: 0

[Enter] to continue...
```

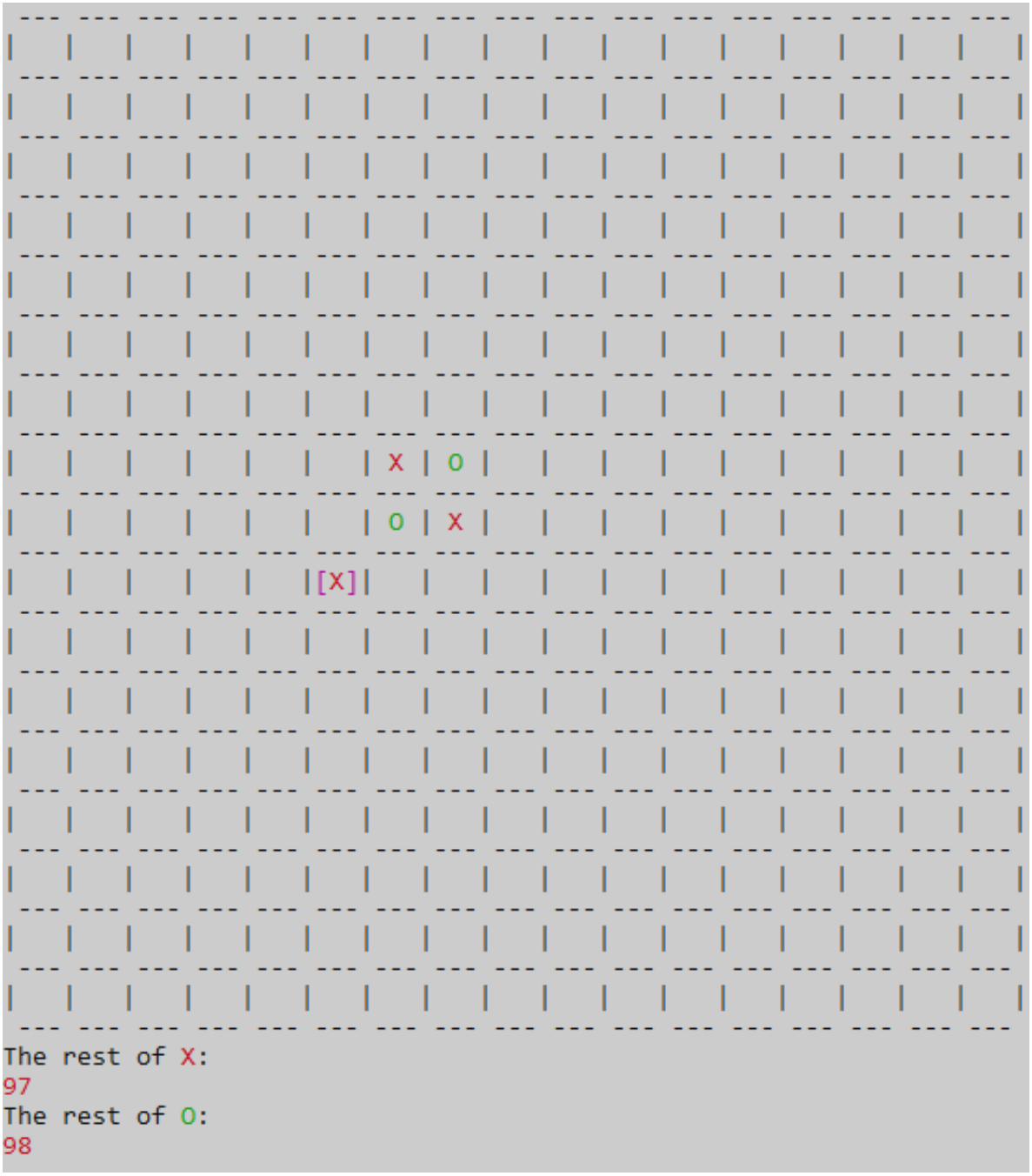
Show the Statistical Outcomes

```
Board size (n x m)
      n (3 ... 17): 17
      m (3 ... 17): 17
How many continuous icons to win? (3, 4, 5). Your choice: 5
Limit step of each Player (10 .. 289): 100
Type player 1's icon (1 character): X
Type player 2's icon (1 character): O
```

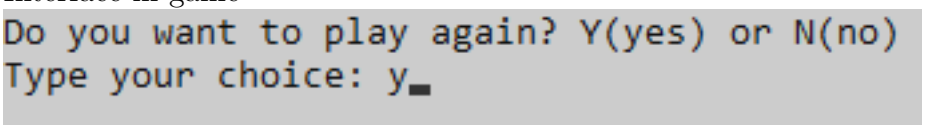
```
     *[Choose color for each icon]*
1: Blue           |Color of X (type a number): 4
2: Green          |Color of O (type a number): 2
3: Aqua           |
4: Red            |
5: Purple         |
6: Yellow         |
7: Gray           |
8: Light Blue     |
9: Light Green    |
10: Light Aqua    |
11: Light Red     |
12: Light Purple  |
13: Light Yellow  |
14: Black         |
```

```
     *MODE*
1: PvP
2: PvE
Your choice: 1
```

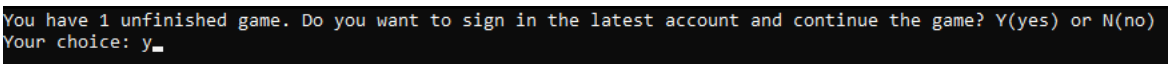
Setting before starting game



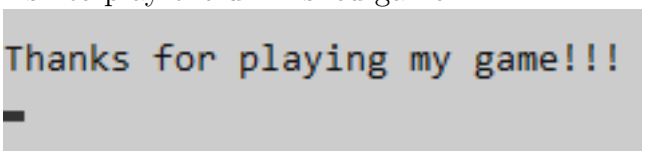
Interface in game



Ask to replay



Ask to play the unfinished game



The end of the game

5 - Referrences

- I have discussed with Tran Thanh Quy - 21127411, Vo Thanh Tu - 21127469 about some ideas.
- https://freetuts.net/ref/ham-strcmp-trong-c-c++-467.html
- https://codelearn.io/sharing/windowsh-ham-dinh-dang-noi-dung-console

THE END